SmallSat Precision Navigation With Low-Cost MEMS IMU Swarms

Completed Technology Project (2013 - 2014)

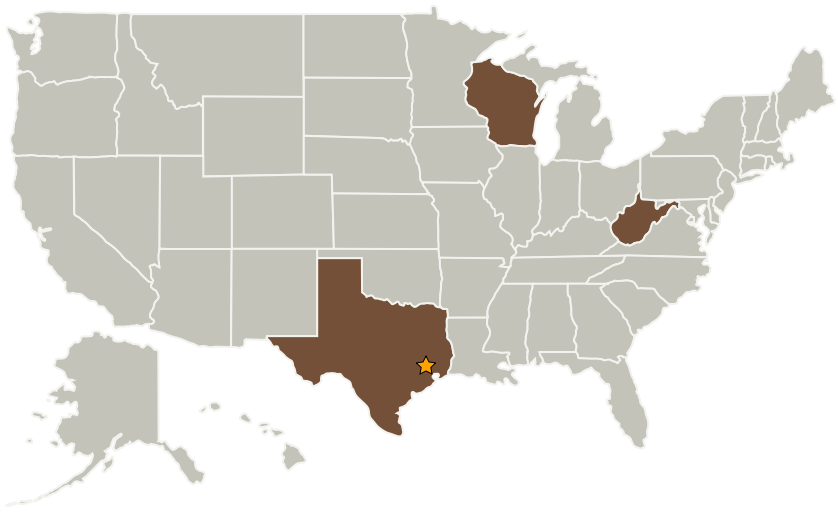
Project Introduction

Small satellite missions are characterized by tight constraints on cost, mass, power, and volume that make them unable to fly high performance inertial measurement units (IMUs) required for orbital missions demanding precise orientation and positioning. Instead, small satellite missions typically fly low-cost MEMS (micro-electro-mechanical system) IMUs. Unfortunately, the performance characteristics of these MEMS IMUs make them ineffectual in many spaceflight applications when employed in a single IMU system configuration. This study will create an 'effective' tactical-grade IMU, thus allowing future small satellites to tackle

Anticipated Benefits

This results of this project will create an Effective tactical-grade IMU, allowing future small satellites to tackle more aggressive missions.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Marquette University	Supporting Organization	Academia	Milwaukee, Wisconsin
West Virginia University	Supporting Organization	Academia	Morgantown, West Virginia

Primary U.S. Work Locations	
Texas	West Virginia
Wisconsin	

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Spacecraft Technology

Project Management

Program Director:

Christopher E Baker

Program Manager:

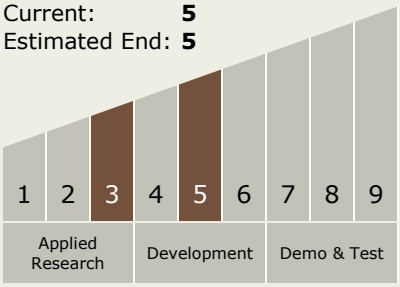
Roger Hunter

Principal Investigator:

John Christian

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Other/Cross-cutting:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors

Target Destinations

Earth, Foundational Knowledge